both RT regimens. Another anonymized CT was distributed for delineation purposes. Four pairs of treatment plans and five delineation sets were compared to the agreed constraints and evaluated by an expert panel. Furthermore, the delineations were quantitatively analyzed and compared to the derived median contour from all delineations.

Results:

Delineation

The expert panel noted only minor protocol violations and approved all delineations. Quantitative analysis showed overall uniformity in contouring with mean distances to the median contour less than 3mm for 7 out of 11 OAR. The distance to median contour was largest for organs that extend in the cranial-caudal direction e.g. larynx and brainstem.

Planning

There were minor protocol violations for some organs at risk (OAR), due to the preference for tumor coverage. These violations were seen for submandibular gland (mean overdose 20.3Gy), inside PTV), mandible (mean overdose 3.3Gy, only in standard RT arm) and the right carotid artery (mean overdose 4.4Gy) and were seen in all analyzed treatment plans, for both RT regimens. In the redistributed radiotherapy arm, all guidelines for the tumor dose and dose redistribution were met successfully by all centers. This did not lead to more protocol violations for OAR. Due to the redistribution, the mean OAR dose in the experimental RT arm was on average 1.7Gy lower compared to the standard arm.

Conclusions: The planning and contouring dummy run of the international ARTFORCE trial showed only minor protocol violations. Redistribution of dose to the tumor to a maximum of 84Gy did not lead to extra dose for organs at risk. Due to consensus on guidelines, high planning and delineation uniformity was achieved.

PO-0663

Early density and volume variations of parotid glands are correlated with acute xerostomia during IMRT for HN cancer

F. Ricchetti[1], M.L. Belli[2], G.M. Cattaneo[2], E. Scalco[3], S. Broggi[2], G. Sanguineti[1], G. Rizzo[3], C. Fiorino[2]
[1]*Johns Hopkins University, Radiation Oncology, Baltimore MD, USA*
[2]*San Raffaele Scientific Institute, Medical Physics, Milan, Italy*
[3]*CNR, Istituto di Bioimmagini e Fisiologia Molecolare, Milan, Italy*

Purpose/Objective: Investigating if early volume and density changes of parotid glands (PGs) are correlated with acute xerostomia scores prospectively assessed in head-neck cancer (HNC) patients treated with IMRT.

Materials and Methods: 24 HNC patients treated radically with RT (+ concomitant chemotherapy) to 58.1/70 Gy (median dose of tumor and nodes PTVs) in 35 fractions with a SIB approach were available for analysis. For each patient 5-9 kVCT images (median 7) were acquired. PGs contours, drawn on the first CT, were automatically propagated to the other images using a validated algorithm, based on a non-rigid image registration. The kinetics of PGs deformation was evaluated in terms of density and volume rate variation during the treatment (rΔρ [HU/day] and rΔvol [mm^3/day]); in particular, density changes during treatment were previously reported by our group as a potential surrogate of acinar loss reduction and consequent increase of the fatty component in the PGs. Prospective assessment of acute xerostomia (CTCAE v.3.0) was performed weekly during the whole treatment (range: grade 1-4). For each patient, both the peak and the mean value of the score were considered. The correlation between acute xerostomia and PGs early rΔρ and rΔvol, during the first 2 weeks of treatment, was evaluated by the Man-Withney test and uni-variate logistic and ROC curve analysis (cut-off: median value for the mean acute xerostomia, grade 2 for peak score). Maximum, minimum and average values of the two PGs were separately considered for each patient.

Results: Early rΔρ and rΔvol were not correlated with peak acute xerostomia while they were found to be significantly correlated with the mean acute score. The minimum change of the two PGs was the most predictive value, resulting in a rΔρ 1-2 [HU/day] equal to -0.98 vs -0.22 (p=0.05) and rΔvol 1-2 [mm^3/day] equal to -455 vs -127 (p=0.03) for patients with mean acute xerostomia ≥ 1.57 or < 1.57, respectively. Early rΔρ and rΔvol result good predictors of the risk of mean acute xerostomia score > 1.57 (median value) in logistic uni-variate analysis (rΔρ OR=0.11, p-value=0.01; rΔvol OR=0.10, p-value=0.04), with a moderately high predictive values (rΔρ AUC=0.76, p-value=0.01; rΔvol AUC=0.77, p-value=0.01). Patients with a mean acute xerostomia > 1.57 show a significantly larger rΔρ and rΔvol at the begin of the treatment (Figure 1). On the other hand, rΔρ and rΔvol are smaller and almost constant during the treatment in patients with mean acute xerostomia score ≤ 1.57.

Conclusions: Early PGs deformation, in terms of both rΔρ and rΔvol is correlated to the mean acute xerostomia during treatment. Although this result needs prospective confirmation on a larger population, it strongly supports the consideration of early density (and volume) variation as a pre-clinical sign of more adverse acute xerostomia symptoms. This information could be likely used to select patients that may benefit from ART and/or supportive therapy.

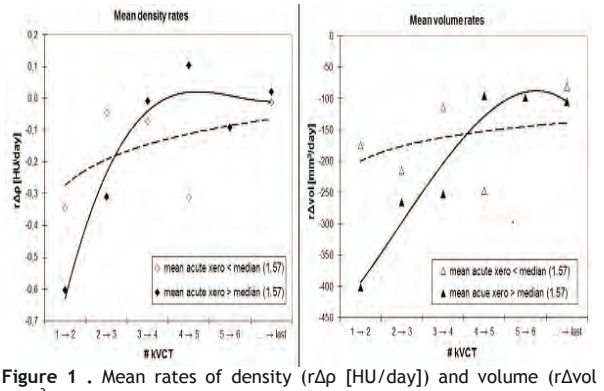

Figure 1 . Mean rates of density (rΔρ [HU/day]) and volume (rΔvol [mm^3/day]) variations calculated on PGs versus the kVCT number, divided based on the median value of the mean acute xerostomia (1.57).

PO-0664

Dry mouth and sticky saliva- Quality of life domains most affected in the acute toxicity phase of radiation therapy

S. Tribius[1], M.C. Raguse[1], C. Voigt[1], C. Woywod[1], A. Kruell[1], C. Petersen[1], C. Bergelt[2], S. Singer[3]
[1]*University Medical Center Hamburg - Eppendorf (UKE, Radiation Oncology Department, Hamburg, Germany*
[2]*University Medical Center Hamburg - Eppendorf (UKE, Department of Psychology, Hamburg, Germany*
[3]*Johannes Gutenberg University Mainz, Institute of Medical Biostatistics Epidemiology and Informatics, Mainz, Germany*

Purpose/Objective: The objective of this study was to evaluate the effect of curative radiation therapy (RT) on different domains of quality of life (QOL) in head and neck cancer patients depending on surgery prior to RT with or without concurrent chemotherapy (CRT).

Materials and Methods: 129 patients with locally advanced head and neck cancer (LAHNC) completed the EORTC QLQ C30 and H&N 35 questionnaires at the beginning (t0) and the end (t1) of radiation therapy, and 6-8 weeks after radiation therapy at first follow-up (t2). All patients received intensity modulated radiation therapy (IMRT) to a total dose of 60-70 Gy with conventional fractionation (2 Gy/d). The following domains were tested: Physical functioning, global quality of life, fatigue,nausea and vomiting, dry mouth, sticky saliva and swallowing. Statistical testing of radiation effects was performed using general linear models with repeated measures, adjusting for the effects of age, initial surgery and simultaneous chemotherapy.

Results: Radiation therapy affects QOL significantly. In all domains but fatigue QOL decreased significantly between t0 and t1 and often recovered until t2, however dry mouth and sticky saliva stayed at high levels until t2. Significant effect modification with primary surgery were found at sticky saliva (p=0.02;figure 2) and swallowing (p=0.002), while there was only weak evidence for a joint effect with simultaneous chemotherapy in physical functioning (p=0.06) and global quality of life (p=0.09).

Conclusions: Despite the use of IMRT, radiation therapy has a negative effect on several domains of quality of life but not on fatigue. Most of these effects are short-term with a significant recovery until 6-8 weeks after radiotherapy. After RT swallowing returns almost to baseline in patients who had prior surgery. While swallowing seems to be less problematic after surgery and RT dryness of mouth and sticky saliva are a more permanent problem and need further attention.

PO-0665

Inhibition of DNA repair by Dasatinib is located in pSFK expressing tumor areas in head and neck xenografts

J. Bussink[1], P.N. Span[1], D.L. Wheeler[2], M. Iida[2], A.J. van der Kogel[1], J.H.A.M. Kaanders[1], H. Stegeman[1]
[1]*Radboud University Nijmegen Medical Center, Radiation Oncology, Nijmegen, The Netherlands*
[2]*University of Wisconsin School of Medicine and Public Health, Department of Human Oncology, Madison, USA*